AMENDMENTS

To The Title of the Invention

Please amend the title of the invention (page 1) to read: Mass Spectrometry with Enhanced Particle Flux Range.

To the Claims

1 - 14. Cancelled

15. (Currently Amended) A time-of-flight mass spectrometer that receives particles, comprising:

a ~~foil~~ secondary electron emission surface (SEES) for transmitting the particles and producing secondary electrons from the particles at the output side of the ~~foil~~ SEES;

a start detector for ~~counting~~ detecting electrons generated from the ~~foil~~ SEES;

a stop detector for ~~counting~~ detecting particles transmitted through the ~~foil~~ SEES; and

~~for at least one of the detectors, a~~ at least one suppression grid placed in the ~~particle~~ electron flight path in front of the start detector, the grid being made from a conductive material such that it may receive an applied voltage and the grid operable to actively repel a portion of the electrons, such that they do not reach the start detector through the grid, with the portion of repelled electrons being determined by the amount of applied voltage.

16. Cancelled.

17. Cancelled.

18. (Original) The spectrometer of Claim 15, further comprising control electronics for varying the voltage applied to the suppression grid.

19. (Previously Presented) The spectrometer of Claim 15, wherein at least one of the start detector or stop detector is a microchannel plate.

20. (Currently Amended) The spectrometer of Claim 15, further comprising a calibration unit programmed to perform calibration ~~programmed to varied to~~ of the voltage applied to the suppression unit, based on data representing a known secondary electron emission curve.

21. (Currently Amended) The spectrometer of Claim 15, further comprising a control unit for applying voltage to the ~~foil~~ SEES.

22. (New) The spectrometer of Claim 19, wherein the control electronics controls the proportion of electrons suppressed in accordance with a known secondary electron emission curve.

23. (New). The spectrometer of Claim 15, wherein the SEES is a foil.

24. (New) The spectrometer of Claim 15, wherein the spectrometer has multiple start channels, each having an SEES, start detector, and suppression grid.

25. (New). A method of using a time-of-flight mass spectrometer to count particles, comprising:

transmitting particles through a secondary electron emission surface (SEES), such that the SEES produces secondary electrons from the particles at the output side of the ~~foil~~ SEES;

detecting the secondary electrons at a start detector;

detecting particles transmitted through the SEES at a stop detector; and

placing a suppression grid in the electron flight path in front of the start detector, the grid being made from a conductive material such that it may receive an applied voltage and the grid operable to actively repel a portion of the electrons, such that they do not reach the start detector through the grid, with the portion of repelled electrons being determined by the amount of applied voltage.

26. (New) The method of Claim 25, wherein the method is a single coincidence method.

27. (New) The method of Claim 25, wherein the applied voltage is adjusted such that the start detector receives a known percentage of the electrons.

28. (New) The method of Claim 25, wherein the applied voltage is adjusted in accordance with known data representing counts of secondary electrons as a function of their electrical energy.

29. (New) The method of Claim 25, further comprising calibrating the applied voltage by periodically scanning a range of voltages applied to the suppression grid while receiving particles into the spectrometer at constant fluxes.

30. (New) The method of Claim 25, further comprising storing calibration data representing a count of electrons emitted by a secondary electron emission surface as a function of their electrical energy, and comparing count data to the calibration data.

31. (New) The method of Claim 30, further comprising measuring counts of the electrons received at the grid as a function of their energy, and comparing the measured data to stored calibration data.

32. (New) The method of Claim 30, further comprising measuring counts of the electrons received at the grid as a function of their species, and comparing the measured data to stored calibration data.

33. (New) The method of Claim 25, further comprising electrically biasing the SEES.

34. (New) The method of Claim 33, wherein the applied voltage to the grid is more negative than the bias applied to the SEES.

35. (New) A time-of-flight mass spectrometer that receives particles, comprising:

a start detector for detecting particles received into the spectrometer;

a secondary electron emission surface (SEES) in the flight path of particles that were previously detected by the start detector, the SEES operable to transmit the particles and to produce stop electrons from the particles at the output side of the SEES;

a stop detector for detecting electrons generated by the SEES; and

a suppression grid placed in an electron flight path in front of the stop detector, the grid being made from a conductive material such that it may receive an applied voltage and the grid operable to actively repel a portion of the electrons, such that they do not reach the stop detector through the grid, with the portion of repelled electrons being determined by the amount of applied voltage.

36. (New) A method of using a time-of-flight mass spectrometer to count particles, comprising:

detecting particles received into the spectrometer at a start detector;

placing a secondary electron emission surface (SEES) in the flight path of particles that were previously detected by the start detector, the SEES operable to transmit the particles and to produce stop electrons from the particles at the output side of the SEES;

detecting electrons generated by the SEES at a stop detector; and

placing a suppression grid in an electron flight path in front of the stop detector, the grid being made from a conductive material such that it may receive an applied voltage and the grid operable to actively repel a portion of the electrons, such that they do not reach the stop detector through the grid, with the portion of repelled electrons being determined by the amount of applied voltage.

37. (New) The method of Claim 36, further comprising calibrating the applied voltage by comparing measured count data with a stored secondary electron emission curve.

38. (New) A time-of-flight mass spectrometer that receives particles, comprising:

a first secondary electron emission surface (SEES) for transmitting the particles and for producing start electrons from the particles at the output side of the first SEES;

a start detector for detecting electrons generated from the first SEES;

a first suppression grid placed in an electron flight path in front of the start detector, the grid being made from a conductive material such that it may receive an applied voltage and the grid operable to actively repel a portion of the electrons, such that they do not reach the start detector through the grid, with the portion of repelled electrons being determined by the amount of applied voltage.

a second secondary electron emission surface (SEES) for transmitting particles received from the first SEES and for producing stop electrons from the particles at the output side of the second SEES;

a stop detector for detecting electrons generated from the second SEES; and

a second suppression grid placed in an electron flight path in front of the stop detector, the grid being made from a conductive material such that it may receive an applied voltage and the grid operable to actively repel a portion of the electrons, such that they do not reach the stop detector through the grid, with the portion of repelled electrons being determined by the amount of applied voltage.

39. (New) The spectrometer of Claim 38, wherein the spectrometer has multiple start channels, each having an SEES, start detector, and suppression grid.

40. (New) A method of using a time-of-flight mass spectrometer to count particles, comprising:

transmitting the particles through a first secondary electron emission surface (SEES), such that the first SEES produces start electrons from the particles at the output side of the first SEES;

detecting electrons generated from the first SEES at a start detector;

placing a first suppression grid in an electron flight path in front of the start detector, the grid being made from a conductive material such that it may receive an applied voltage and the grid operable to actively repel a portion of the electrons, such that they do not reach

the start detector through the grid, with the portion of repelled electrons being determined by the amount of applied voltage;

transmitting particles transmitted through the first SEES through a second secondary electron emission surface (SEES), such that the second SEES produces stop electrons from the particles at the output side of the second SEES;

detecting electrons generated by the second SEES at a stop detector; and

placing a second suppression grid in an electron flight path in front of the stop detector, the grid being made from a conductive material such that it may receive an applied voltage and the grid operable to actively repel a portion of the electrons, such that they do not reach the stop detector through the grid, with the portion of repelled electrons being determined by the amount of applied voltage.

41. (New) The method of Claim 40, further comprising calibrating the applied voltage by comparing measured count data with a stored secondary electron emission curve.